POSITION PAPER: Capnography in Advanced Airway Interventions

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Definitions:

Capnography is technology that may alert the pre-hospital provider to changes in carbon dioxide retention and perfusion and aids in monitoring the of endotracheal tube placement.

Background:

Increasing concern has been voiced in the EMS literature about pre-hospital airway care, particularly endotracheal intubation in the field. Successful intubation rates in several settings, both with and without pharmacologic assistance, have been less than expected or desired. The incidence of complications of intubation, either improper endotracheal tube placement (e.g. esophageal intubation) or unrecognized dislodgement of the tube have been of particular concern in pediatric patients. Capnography, when integrated into advanced airway management protocols offers the ability to improve recognition of proper endotracheal tube placement, continued monitoring of the effectiveness of airway management and ventilation, as well as the earliest possible warnings of complications of endotracheal intubation.

Qualitative, or colorimetric, capnography has proven to be a useful adjunct in determining proper endotracheal tube placement. These devices are relatively inexpensive, easily used and interpreted, and very portable. Their ability to provide continued monitoring is limited, and they are not able to provide quantitative information about the effectiveness of ventilation.

Quantitative capnography is becoming increasingly available as technology improves, the expense involved in its use has fallen, and it has become integrated along with other non-invasive monitoring modalities in monitor-defibrillators commonly used in the field practice. Quantitative capnography not only offers initial documentation of endotracheal tube placement, but is better suited to continuous monitoring of endotracheal tube placement. In addition, units that provide numerical or wave-form output allow continuous monitoring of end-tidal CO_2 levels thus guiding ventilatory management, helping to avoid over or under-ventilation. Units that include the ability to provide a print-out of the display have the additional advantage of providing documentation of proper tube placement in the field and at the time the patient's care is transferred to another care provider. The principal drawback to its use involves the initial expense of obtaining a monitoring unit either as a stand-alone unit, or integrated in a monitor-defibrillator.

The following are proposals regarding use of capnography in field endotracheal intubation:

All intubation protocols should include the use of capnography to confirm proper tube placement and address use of capnography when reassessing proper endotracheal tube placement and the effectiveness of ventilation. At a minimum, colorimetric capnography should be available with other methods to ensure proper tube placement. The use of quantitative capnography is encouraged.

The use of quantitative capnography is strongly encouraged when intubation of pediatric patients is allowed under advanced airway protocols, with emphasis not only on confirmation of endotracheal tube placement as well as careful continuous monitoring of airway and ventilatory effectiveness.

The use of quantitative capnography is strongly encouraged in all protocols that allow rapid-sequence or pharmacologically assisted intubation.

When a quantitative unit is selected, the choice of a unit that is able to provide a print-out of instantaneous data as well as patient trends is encouraged as well.

Funding agencies, such as the Financial Assistance Review Committee, should favorably consider grant requests for capnographic monitoring equipment, particularly when requested as a module for either existing or new/replacement monitor defibrillator units.

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